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SCALE	REVISION	REMARK	TITLE
DATE: JAN. 16, 1998			AE100T
DRAWING NO.			SCHEMATIC DIAGRAM
GE-97C-2846			
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TOKYO, JAPAN 108

Tokyo: Jan. 19, 1998

Reference No. 98003

S P E C I F I C A T I O N S

SUBJECT : VHF/UHF AM-FM PROGRAMMABLE SCANNING RECEIVER WITH TUNING KNOB
(EUROPEAN MODEL) AE100T

1. GENERAL

- 1 Programmable channel : 500 Memory channels (50 channels x 10 banks)
 - 10 Limit search bank
 - 50 Monitor channels
 - 10 Priority channels
 - 23 Bands search

- 2 Receiving system : PLL synthesizer triple conversion superheterodyne
 - 1st IF 225.4125-225.5875, 226.4125-226.5875,
604.905-605, 610.905-611,
611.905-612.0875 and 612.905-613MHz)
 - : the 1st Local OSC frequency employs upper side (approx. 612MHz) of receiving frequency range (25-450MHz).
 - : the 1st Local OSC frequency employs upper side (approx. 226.5MHz) of receiving frequency range (450.0125-848.9875MHz).
 - : the 1st Local OSC frequency employs lower side (approx. 226.5MHz) of receiving frequency range (849-1250MHz).
 - : the 1st Local OSC frequency employs lower side (612MHz) of receiving frequency range (1250.0125-1300MHz).
 - 2nd IF (45MHz)
 - receiving frequency range 25-450MHz and 1250.0125-1300MHz
 - : the 2nd Local OSC frequency employs 45MHz lower side of 1st IF (approx. 612MHz)
 - receiving frequency range 450.0125-1250MHz
 - : the 2nd Local OSC frequency employs 45MHz upper side of 1st IF (approx. 226.5MHz)

- cont'd -

PRODUCT DEVELOPMENT & MANUFACTURING

3rd IF (10.7MHz) for WIDE FM

: the 3rd local OSC frequency employs lower side of 2nd IF

3rd IF (455kHz) for NARROW FM and AM

: the 3rd local OSC frequency employs lower side of 2nd IF

- 3 Receiving wave mode : WIDE FM (FM broadcast)
NARROW FM (Business, communication, ham radio)
AM (Aircraft)
- 4 Frequency range and Mode
- | | <u>Freq.</u> (MHz) | <u>Step</u> | <u>Mode</u> (Default) |
|--------------------------|--|-------------|-----------------------|
| 4-1) Frequency, step and | 25.0000- 87.4950 | 5.0kHz | NFM |
| | 87.5000- 107.9500 | 50.0kHz | WFM |
| | 108.0000- 136.9750 | 25.0kHz | AM |
| | 137.0000- 143.9950 | 5.0kHz | NFM |
| | 144.0000- 146.0000 | 12.5kHz | NFM |
| | 146.0050- 224.9950 | 5.0kHz | NFM |
| | 225.0000- 399.9875 | 12.5kHz | AM |
| | 400.0000-1300.0000 | 12.5kHz | NFM |
| 4-2) Band search | 26-28, 28-30, 31-32, 46-47, 50-54, 70-84,
84-87.495, 87.5-107.95, 108-118, 118-136.975,
144-146, 153-154, 154-155, 156-163, 163-174,
230-330, 430-440, 460-466, 466-469, 930-932,
935-939, 959-960, 1240-1300MHz | | |
- 5 Scanning rate : 40 channels/sec.
- 6 Searching rate : 75 steps/sec.
- 7 Attenuator : Approx. 20dB from 25MHz to 500MHz, approx. 15dB from 500MHz to 1300MHz
- 8 Frequency, Mode and S-Meter: LCD with backlighting
- 9 Zeromatic : Activates during search mode.
- 10 Audio output : 1.3W nominal
- 11 Speaker : Built-in 77mm 8 ohms Dynamic speaker
- 12 Operating Voltage and power consumption : 220-240V AC 50Hz 12W or DC 13.8V, 400mA

- 13 Dimension : Approx. 232 (W) x 210 (D) x 90 (H) mm
- 14 Weight : Approx. 2kg without antenna
- 15 Accessory : Telescopic antenna and Owner's manual
- 16 Memory backup : Rechargeable lithium battery

2. ELECTRICAL

- 1 Frequency coverage : 25.0000-1300.0000MHz

-2 Sensitivity		<u>Nominal</u>	<u>Limit</u>
NFM : (S+N)/N=20dB	: 25MHz- 500MHz	0.5 μ V	2 μ V
DEV. : 3kHz at 1kHz	500.0125MHz-1000MHz	1 μ V	3 μ V
	1000.0125MHz-1300MHz	2 μ V	5 μ V
AM : (S+N)/N=20dB	: 25MHz- 500MHz	2 μ V	5 μ V
MODE: 60% at 1kHz	500.0125MHz-1000MHz	3 μ V	10 μ V
	1000.0125MHz-1300MHz	5 μ V	20 μ V
WFM : (S+N)/N=30dB	: 25MHz- 500MHz	3 μ V	10 μ V
DEV. : 45kHz at 1kHz	500.0125MHz-1000MHz	3 μ V	10 μ V
	1000.0125MHz-1300MHz	5 μ V	20 μ V

- 3 Image ratio

1st IF Image	: VHF Low at 30MHz	65dB	50dB
	30MHz + (2 x 612MHz) = 1254MHz		
	Aircraft at 126MHz	65dB	50dB
	126MHz + (2 x 612MHz) = 1350MHz		
	VHF High at 150MHz	65dB	50dB
	150MHz + (2 x 612MHz) = 1374MHz		
	UHF Low at 400MHz	50dB	Not specified
	400MHz + (2 x 612MHz) = 1624MHz		
	UHF High at 760MHz	40dB	Not specified
	760MHz + (2 x 226.5MHz) = 1213MHz		
	UHF High at 1000MHz	30dB	Not specified
	1000MHz - (2 x 226.5MHz) = 547MHz		

		<u>Nominal</u>	<u>Limit</u>
2nd IF Image	: VHF High at 150MHz 612MHz - (2 x 45MHz) = 522MHz	70dB	50dB
	UFH High at 760MHz 226.5MHz + (2 x 45MHz) = 316.5MHz	70dB	50dB
-4 Squelch sensitivity			
NFM and AM Threshold	: 25MHz - 500MHz 500.0125MHz - 1000MHz 1000.0125MHz - 1300MHz	0.5 μ V 0.5 μ V 3 μ V	2 μ V 2 μ V 10 μ V
Tight: (S+N)/N	25MHz - 500MHz 500.0125MHz - 1000MHz 1000.0125MHz - 1300MHz	25dB 25dB 25dB	15dB 15dB 15dB
WFM Threshold	: 25MHz - 500MHz 500.0125MHz - 1000MHz 1000.0125MHz - 1300MHz	3 μ V 3 μ V 15 μ V	10 μ V 10 μ V 30 μ V
Tight: (S+N)/N	25MHz - 500MHz 500.0125MHz - 1000MHz 1000.0125MHz - 1300MHz	50dB 50dB 50dB	30dB 30dB 30dB
-5 Selectivity			
NFM	: -6dB -50dB	\pm 10kHz \pm 20kHz	\pm 14kHz \pm 25kHz
AM	: -6dB -50dB	\pm 6kHz \pm 12kHz	\pm 10kHz \pm 20kHz
WFM	: -6dB -50dB	\pm 150kHz \pm 300kHz	\pm 200kHz \pm 400kHz
-6 Spurious rejection (Except primary image)	: at 400MHz (NFM)	40dB	30dB
-7 IF rejection	: 612MHz at 400MHz 226.5MHz at 760MHz 45MHz at 400MHz	60dB 70dB 100dB	40dB 40dB 60dB
-8 Acceptable radio frequency displacement (EIA RS-204D)			
NFM at 400MHz	: kHz	\pm 6kHz	\pm 3kHz

-9 Signal to noise ratio

		<u>Nominal</u>	<u>Limit</u>
AM and FM			
RF input 100 μ V	: 25MHz - 500MHz	40dB	30dB
DEV. 3kHz at 1kHz	500.0125MHz - 1000MHz	40dB	30dB
MOD. 60% at 1kHz	1000.0125MHz - 1300MHz	40dB	30dB
WFM			
RF input 100 μ V	: 25MHz - 500MHz	50dB	40dB
DEV. 45kHz at 1kHz	500.0125MHz - 1000MHz	50dB	40dB
	1000.0125MHz - 1300MHz	50dB	40dB

-10 Residual noise : 1mV 3mV
(Vol. Min., Squelched)

-11 Birdies and stop frequency : Under discussion
when search

-12 Scanning rate : 40 channels/sec. 15-50 channels/sec.

-13 Search rate : 75 steps/sec. 3-85 steps/sec.

-14 Automatic memory rate : 20 steps/sec. 2-22 steps/sec.

-15 Priority sampling : 2sec. 1-3sec.

-16 Scan delay time : 2sec. 1-3sec.

-17 Attenuator : 25MHz - 500MHz 20dB 15-25dB
500.0125MHz - 1300MHz 15dB 10-20dB

-18 Signal meter

NFM	: S-1	(S+N)/N = 15dB	Not specified
	S-FULL	(S+N)/N = 30dB	Not specified
AM	: S-1	(S+N)/N = 10dB	Not specified
	S-FULL	(S+N)/N = 25dB	Not specified
WFM	: S-1	(S+N)/N = 40dB	Not specified
	S-FULL	(S+N)/N = 55dB	Not specified

-19 Audio max. power : AC 230V 50Hz 2.0W 1.5W
 (RF input 100 μ V at 400MHz) DC 13.8V 1.7W 1.3W
 (DEV.: 3kHz at 1kHz)
 (LOAD: 8 ohms)

			<u>Nominal</u>	<u>Limit</u>
-20	Audio output power : AC 230V 50Hz at T.H.D. 10% DC 13.8V		1.6W 1.3W	1.2W 1.0W
-21	T.H.D. at 0.5 watt output : power		2%	5%
-22	Headphone max. output power:			
	RF input 100 μ V at 400Hz DEV.: 3kHz at 1kHz			
	8 Ω mono/stereo (each phone) AC 230V 50Hz		5.5mW/5.3mW	8.8mW
	16 Ω mono/stereo (each phone) AC 230V 50Hz		11.5mW/10.3mW	18.5mW
	32 Ω mono/stereo (each phone) AC 230V 50Hz		19.5mW/15.3mW	31mW
	64 Ω mono/stereo (each phone) AC 230V 50Hz		31mW/20.5mW	49mW
	8 Ω mono/stereo (each phone) DC 13.8V		4.5mW/4.1mW	7.2mW
	16 Ω mono/stereo (each phone) DC 13.8V		9.1mW/8.0mW	14.5mW
	32 Ω mono/stereo (each phone) DC 13.8V		15.3mW/12.2mW	25mW
	64 Ω mono/stereo (each phone) DC 13.8V		24.4mW/16.2mW	40mW
-23	Tape output			
	NFM : NFM DEV.: 3kHz at 1kHz		540mV	300mV
	AM : AM MODE: 60% at 1kHz		510mV	300mV
	WFM : WFM DEV.: 45kHz at 1kHz		590mV	300mV
	RF input: 100 μ V LOAD : 10k ohms			
-24	Audio frequency response : NFM/AM/WFM at -6dB		300Hz 2.0kHz	200-400Hz 1.5-3kHz
-25	Memory holdtime :		3 months	2.5 months

(Requires at least 4 days connection to the AC or DC power supply)

- 26 Intermediate frequency : 1st 225.4125-225.5875MHz
226.4125-226.5875MHz
604.905 -605.000MHz
610.905 -611.000MHz
611.905 -612.0875MHz
612.905 -613.000MHz
2nd 45MHz
3rd 10.7MHz at WFM MODE
455kHz at NFM and AM MODE
- 27 Filter : Monolithic crystal filter for 45MHz
Ceramic filter for 10.7MHz and 455kHz
- 28 Antenna impedance : 50 ohms
- 29 Temperature range : Test to specification between: +18°C - +35°C
Operate (Need not meet spec.): 0°C - +43°C

3. OPERATING CONTROLS AND CONNECTIONS

- 1 Volume control with rotary type power switch
- 2 Tuning knob
- 3 Squelch control
- 4 Keyboard (29 Keys)
- 5 8 digit frequency display by LCD
- 6 3 digit channel indicator by LCD
- 7 Indicator : ▲, ▼, SCAN, MANUAL, SEARCH, PROGRAM, AUTO, AM, FM, WFM, CH, TUNE, DELAY, LOCK-OUT, PRIORITY, BANK, MONITOR, ATT, Signal meter and ERROR
- 8 BNC type antenna connector
- 9 Headphone jack (D=3.5mm stereo)
- 10 DC power connector
- 11 External speaker jack
- 12 Tape out connector (RCA type)
- 13 Remote control connector for Tape recorder
- 14 20dB attenuator (keyboard)
- 15 AC power cord

4. FEATURES

- 1 500 memory channels
- 2 10 banks for channel grouping
- 3 10 limit search bank
- 4 Changes receiving frequencies by the tuning knob

- 5 Changes manual, program by the tuning knob
- 6 Changes Limit search banks and Band search by the tuning knob
- 7 23 bands search
- 8 Direct search
- 9 50 monitor temporary memories
- 10 500 channels automatic scanning for VHF to UHF and AIR band [cleared channels (000.000 freq.) are not scan]
- 11 40 channels/sec. scanning rate and 75 steps/sec. searching rate
- 12 Automatic memory function of receiving frequencies
- 13 Shows alarm for preventing duplicate frequencies
- 14 Lock-out frequencies (maximum 200 frequencies on search mode)
- 15 Built-in 10 priority channels
- 16 Built-in electrical channel lock-out circuit
- 17 Lock out channel review and lock-out frequencies review
- 18 Built-in electrical scan delay circuit
- 19 Change the direction at the manual scan and searching by ▲ or ▼
- 20 Zeromatic tuning system
- 21 Direct access to over 117,000 frequencies
- 22 Manual selection for channel
- 23 Sort all the frequencies within bank in the ascending or descending order
- 24 Moving frequencies from banks to monitor memory
- 25 Deleting a frequencies from a channel or monitor memory
- 26 Deleting frequency from locked-out within a bank
- 27 Deleting all frequencies from channels within a bank
- 28 11 digit display for channel and frequency with all function indicators
- 29 LCD back-lighting
- 30 Headphone jack (D=3.5mm)
- 31 BNC antenna connector
- 32 Tape-out connector
- 33 Crystal filter for 45MHz 2nd IF and Ceramic filter for 10.7MHz (WFM), 455kHz (AM, NFM) 3rd IF section
- 34 Regulated DC power supply circuit
- 35 Built-in dynamic speaker
- 36 Automatic switching for AM, FM or WFM reception
- 37 Changeable for AM, FM or WFM reception
- 38 Signal meter on LCD
- 39 Attenuator control
- 40 Remote control output for tape recorder